Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. **(Currently Amended)** An apparatus for diagnosing problems in multiple node networks using probing technology, the apparatus comprising:

an arrangement for determining a candidate probe set;

an arrangement for determining which problems can be diagnosed by the candidate probe set; ~~and~~

an arrangement for finding small probe sets which can diagnose the same problems as the candidate probe set[[.]]; and

an arrangement for diagnosing problems in the multiple node network based upon a success or failure of probes in the small probe sets.

2. **(Original)** The apparatus according to Claim 1, wherein the candidate probe set is determined by considering the routes that a probe can traverse through the network from at least one node to at least one other node in the network.

3. **(Original)** The apparatus according to Claim 2, wherein the candidate probe set is determined by using a dependency matrix which has as many rows as the number of probes and as many columns as the number of nodes and each matrix entry is either 1 or 0 depending on whether or not the probe passes through that node.

4. **(Original)** The apparatus according to Claim 3, wherein which problems can be diagnosed by the candidate probe are determined by traversing the dependency matrix row-by-row and grouping nodes together if a fault in any one of them cannot be distinguished by a fault in another node in the group.

5. **(Original)** The apparatus according to Claim 4, wherein the faults cannot be distinguished by determining if their corresponding columns in the dependency matrix are identical.

6. **(Original)** The apparatus according to Claim 5, wherein the small probe sets which can diagnose the same problems as the candidate probe set are found using a search selected from the group consisting of exhaustive search, quick search, and greedy search.

7. **(Original)** The apparatus according to Claim 6, wherein the exhaustive search considers in order of increasing size all possible combinations of probes such that each node has at least one probe passing through it until a set is found that can diagnose the same problems as the candidate set.

8. **(Original)** The apparatus according to Claim 6, wherein the quick search traverses the candidate probe set row-by-row and removes probes that are not needed to diagnose the same problems as the candidate set.

9. **(Original)** The apparatus according to Claim 6, wherein at each step of the greedy search what is believed to be the "most informative" of the remaining probes is

added to the current probe set until the probe set diagnoses the same problems as the candidate set.

10. **(Currently Amended)** A method for diagnosing problems in multiple node networks using probing technology, the method comprising the steps of:

determining a candidate probe set;

determining which problems can be diagnosed by the candidate probe set; ~~and~~

finding small probe sets which can diagnose the same problems as the candidate probe set[[.]]; and

diagnosing problems in the multiple node network based upon a success or failure of probes in the small probe sets.

11. **(Original)** The method according to Claim 10, wherein the candidate probe set is determined by considering the routes that a probe can traverse through the network from at least one node to at least one other node in the network.

12. **(Original)** The method according to Claim 11, wherein the candidate probe set is determined by using a dependency matrix which has as many rows as the number of probes and as many columns as the number of nodes and each matrix entry is either 1 or 0 depending on whether or not the probe passes through that node.

13. **(Original)** The method according to Claim 12, wherein which problems can be diagnosed by the candidate probe are determined by traversing the dependency matrix

row-by-row and grouping nodes together if a fault in any one of them cannot be distinguished by a fault in another node in the group.

14. **(Original)** The method according to Claim 13, wherein the faults cannot be distinguished by determining if their corresponding columns in the dependency matrix are identical.

15. **(Original)** The method according to Claim 14, wherein the small probe sets which can diagnose the same problems as the candidate probe set are found using a search selected from the group consisting of exhaustive search, quick search, and greedy search.

16. **(Original)** The method according to Claim 15, wherein the exhaustive search considers in order of increasing size all possible combinations of probes such that each node has at least one probe passing through it until a set is found that can diagnose the same problems as the candidate set.

17. **(Original)** The method according to Claim 15, wherein the quick search traverses the candidate probe set row-by-row and removes probes that are not needed to diagnose the same problems as the candidate set.

18. **(Original)** The method according to Claim 15, wherein at each step of the greedy search what is believed to be the "most informative" of the remaining probes is added to the current probe set until the probe set diagnoses the same problems as the candidate set.

19. **(Currently Amended)** A program storage device readable by machine, tangibly embodying a program of instructions executable by the machine to perform method steps for diagnosing problems in multiple node networks using probing technology, said method comprising the steps of:

determining a candidate probe set;

determining which problems can be diagnosed by the candidate probe set; ~~and~~

finding small probe sets which can diagnose the same problems as the candidate probe set[[.]]; and

diagnosing problems in the multiple node network based upon a success or failure of probes in the small probe sets.